B and C Gas Law Practice

Show all work. Do not forget to pull all information out of question and use unit (and the correct units). Use green sheets to help with unit conversion.

1. What two gas law variables are constant in Charles' Law?

2. What two gas law variables are constant in Boyles Law?

3. How do you convert °C → K?

4. Convert the following:
   a. 21°C to K
   b. 345K to °C
   c. 4300kPa to atm
   d. 450mmHg to kPa
   e. 24K to °C
   f. $5.0m^3$ to L

5. A gas tank holds 2785 L of propane, C3H8, at 830 mmHg. What is the volume of the propane at standard pressure?

6. A sample of neon occupies a volume of 461 mL at STP. What will be the volume of the neon when the pressure is reduced to 93.3 kPa?

7. 352mL of chlorine under a pressure of 680 mmHg are placed in a container under a pressure of 1210 mmHg. The temperature remains constant at 296 K. What is the volume of the container in liters?

8. Use Charles' Law to explain why you should never throw a pressurized aerosol container into a fire. A fire's temperature is approximately 400^oC.

9. If I have 45 liters of helium in a balloon at 25^0 C and increase the temperature of the balloon to 55^0 C, what will the new volume of the balloon be?

10. I've got a car with an internal volume of 12,000 L. If I drive my car into the river and it implodes, what will be the volume of the gas when the pressure goes from 1.0atm to 1.4atm?

11. Calcium carbonate decomposes at 1200^0 C to form carbon dioxide and calcium oxide. If 25 liters of carbon dioxide are collected at 1200^0 C, what will the volume of this gas be after it cools to 25^0 C?

12. I have 130 liters of gas in a piston at a temperature of 250^0 C. If I cool the gas until the volume decreases to 85 liters, what will temperature of the gas be?

13. If I have 5.6 L of gas in a piston at a pressure of 1.5 atm and compress the gas until its volume is 4.8 L, what will the new pressure inside the piston be?

14. I have added 15 L of air to a balloon at sea level (1.0 atm). If I take the balloon with me to Denver, where the air pressure is 0.85atm, what will the new volume of the balloon be?

15. A rigid container has an initial pressure of 1.50 atm at 21^{o}C. What will the pressure be if the temperature is increased to 121^{o}C?

16. The pressure inside a container is 770 mmHg at a temperature of 57^{o}C. What would the pressure be at 75^{o}C?

17. A rigid container is at a temperature of 112^{o}C. When heated to 224^{o}C, the pressure was 288 kPa. What was the initial pressure?

18. A container holds 50.0 mL of nitrogen at 25° C and a pressure of 736 mm Hg. What will be its volume if the temperature increases by 35° C?

19. A sample of oxygen occupies a volume of 160 dm^3 at 91° C. What will be volume of oxygen when the temperature drops to 0.00° C?

20. A sample of hydrogen has an initial temperature of 50.0° C. When the temperature is lowered to -5.0° C, the volume of hydrogen becomes 212 cm^3. What was the initial volume of the hydrogen in dm^3?

21. 568 dm^3 of chlorine at 25° C will occupy what volume at -25° C while the pressure remains constant?

22. A sample of helium has a volume of 521 dm3 at a pressure of 75 cm Hg and a temperature of 18° C . When the temperature is increased to 23° C, what is the volume of the helium?

Key

1. Pressure, moles
2. Temperature, moles
3. 273 +K
4. a. 294K b. 72 K c. 42.4atm d. 60kPa e. 249 f. 5000L
5. 3041.5L
6. 500.65L
7. 0.198L
8. As temp goes up vol increases, so in a fire vol would expand greatly
9. 49.5L
10. 8571.4L
11. 5.06L
12. 341.96K
13. 1.75atm
14. 17.65L
15. 2.01atm
16. 812mmHg
17. 223.1kPa
18. 51.6mL
19. 120dm3
20. 255.5cm3
21. 472.7dm3
22. 530.dm3